

## Predicting vulnerability of Southeastern sea turtle nesting beaches to climate change

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**Overview:** Sea-level rise (SLR), increased storminess, and altered temperature and humidity associated with climate change may reduce suitability of nesting and foraging habitat used by federally threatened and endangered species, specifically for federally threatened loggerhead sea turtles (*Caretta caretta*). Loggerheads have recently been proposed for upgrading from threatened to endangered status (USFWS & NOAA 2010) due to concerns over declining nest numbers and interactions with longline fisheries.

Proposed study sites include Cape Romain National Wildlife Refuge, Canaveral National Seashore, Archie Carr National Wildlife Refuge, Everglades National Park, Pine Island National Wildlife Refuge, and Padre Island National Seashore.

**Project Goal:** Producing a vulnerability assessment of coastal habitats representing important nesting grounds specifically for federally threatened loggerhead sea turtles (*Caretta caretta*). Since some of the same nesting beaches are also important for other endangered sea turtles (i.e., Kemp's ridleys (*Lepidochelys kempii*), green turtles (*Chelonia mydas*), and leatherbacks (*Dermochelys coriacea*)), this project represents a vulnerability assessment of coastal nesting habitats for multiple species of national conservation significance.

**Deliverables:** This is a two-year project that builds upon work already being done (and subsequent data produced) as part of the La Florida project, as well as work underway as part of the USGS Coastal and Marine Geology Program's Shoreline and Sea-level rise project and a NASA funded Dune Vulnerability project.

1. Vulnerability maps of sea turtle nesting beaches for the regions modeled
2. Maps of historic and expected changes in occupancy rates for modeled habitats
3. Reports and peer-reviewed publications that disseminate our findings, including distribution of data and model results. USGS Fact Sheets will be developed after Year 2.
4. Key products will include maps that describe the present vulnerability under a number of current and future climate scenarios. These maps will provide management guidance now, and serve to help identify where knowledge and data gaps exist that are primary sources of uncertainty.
5. Integrated biological response models which will show nesting site "occupancy" and phenological responses as a function of the beach characteristics likely to be influenced by climate change and SLR.

**Timeline:**

**SCHEDULE (assumes funding in 3rd Quarter FY11)**

<b>Fiscal Year</b>	<b>11</b>				<b>12</b>			
<b>Quarter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Project Coordination			X	X	X	X	X	X
Literature Reviews			X	X	X	X	X	X
Workshops					X			X
Sea Turtle Data Acquisition			X	X	X	X	X	X
Geological Data Acquisition			X	X	X	X	X	X
Integration of Climate Downscaling				X	X	X	X	X
Calibrations					X	X	X	X
Annual and Final Reports						X		X